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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,817	11/13/2003	Liang Dong	A8637	7847

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EXAMINER

PAK, SUNG H

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/705,817	Applicant(s) DONG ET AL.	
	Examiner Sung H. Pak	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1103, 1203</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Information Disclosure Statement

Information disclosure statements filed 11/13/2003 and 12/09/2003 have been considered by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 7, 9, 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ruffin (US 4,606,020).

Ruffin discloses an optical device with all the limitations set forth in the claims, including: a fiber bundle having an outer diameter (Fig. 2a); a first optical fiber having an outer diameter that is at least equal to the outer diameter of the fiber bundle (Fig. 2b); wherein the fiber bundle is spliced to the first optical fiber (column 2 lines 42-48); wherein the fiber bundle comprises plurality of small diameter single mode or few mode optical fibers carrying light at signal wavelengths (column 3 lines 14-55); wherein the fiber bundle comprises a plurality of fibers arranged about a core fiber, the plurality of fibers are arranged in a hexagonal arrangement held by a capillary (holder sheath) (Fig. 2a, 3a, 3b); wherein the first optical fiber has multimode core (column 3 lines 54-55); a second optical fiber, wherein the second fiber is spliced to the first fiber (Fig. 1).

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Ruffin also discloses a method for producing a fiber optic assembly comprising: providing a fiber bundle having an outer diameter, and splicing a first optical fiber to the fiber bundle, wherein the first optical fiber has an outer diameter which is at least equal to the outer diameter of the fiber bundle (column 3 lines 16-20); wherein the fiber bundle is first fused at one location and then cleaved at the fused location to form fiber bundle end for splicing (column 3 lines 21-23); wherein the splicing step is carried out by a fusion arc (column 3 line 20); providing a capillary (sheath) surrounding the fiber bundle and the first optical fiber, providing arc-entrance apertures in the capillary and fusing the capillary to the fiber bundle and the first optical fiber ('4' Fig. 1, column 3 lines 16-23).

Claims 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by DiGiovanni et al (US 5,864,644).

DiGiovanni discloses an optical device with all the limitations set forth in the claims, including: a cladding pumped fiber, wherein the core is doped with rare earth ions ('15' Fig. 1a); a plurality of optical sources for optically pumping the cladding pumped fiber ('9'); a plurality of multimode fibers optically coupling the optical sources to the cladding pumped fiber, each multimode fiber having a first end coupled to one of the plurality of optical sources and a second end coupled to the cladding pumped fiber for coupling multimode light into a cladding of the cladding pumped fiber ('11'); a multimode fiber coupled to the cladding pumped fiber for coupling single mode light (Fig. 1a); wherein the plurality of multimode fibers and the multimode core fiber are bundled together into a fiber bundle, and the fiber bundle being tapered

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to a reduced cross sectional area prior to being coupled to the cladding pumped fiber (Fig. 1a, column 2 line 55- column 3 line 50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffin (US 4,606,020).

Ruffin discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of capillary that has a lower refractive index than the cladding of the fibers in the fiber bundle. However, capillary sheaths having lower refractive index than the fiber cladding in the fiber bundle are well known and common in the art. Capillaries having lower refractive index are advantageous and desirable because it

allows the transmitted optical signals to be effectively confined within the fiber bundle and prevents cladding leak of transmitted light. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Ruffin device to have capillary sheath that has refractive index lower than the cladding of the optical fiber in the fiber bundle.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruffin (US 4,606,020) in view of Elias et al (US 5,751,873).

Ruffin discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of filler fibers that maintains the fiber bundle in a predetermined shape.

Elias, on the other hand, explicitly teaches the use of filler fibers that maintains the fiber bundle in a rhombus shape (Fig. 1). The use of filler fibers is considered advantageous and desirable in the art because it allows the fiber bundles to be tightly wound and precisely maintain the fiber positions for optimal light coupling between fiber bundles. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Ruffin device to have filler fibers that maintains the fiber bundle in the predetermined shape.

Claims 1, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiovanni (US 5,864,644) in view of Ruffin (US 4,606,020).

DiGiovanni discloses an optical device with limitations as discussed above. However, DiGiovanni teaches drawing the fiber bundle into a tapered form, instead of coupling the fiber

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bundle to another optical fiber having an outer diameter that matches the outer diameter of the fiber bundle.

On the other hand, Ruffin explicitly teaches the coupling arrangement wherein a bundle of optical fibers are spliced to a single fiber having an outer diameter matching the outer diameter of the bundle. Ruffin teaches that this configuration is advantageous and desirable because it enhances the coupling efficiency, and at the same time, reduces complexity and size of the coupling mechanism. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the DiGiovanni device to have the fiber bundle spliced to another fiber having an outer diameter that matches the outer diameter of the fiber bundle.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vakili et al (US 6,823,117), Sahlin (US 2002/0172478 A1), Murphy et al (US 5,809,189), and Lin et al (US 6,816,652 B1) discloses fiber optic bundle coupling arrangements.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak
Examiner
Art Unit 2874

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